

PERSON, B.Ye.; ... A.I.; ...

Simultaneous bilateral superior and inferior lobes of the lungs. Gross. khir. 5.0. 1963.

1. Address: Moscow 1-34, ... Institute of ...

MAKSIMOV, I.A. (Moskva, V-315, Leninskiy pr., d.87a, korp.1, kv.38)
PINOGOV, A.I.; KLIONER, L.I. (Moskva, pr.Mira, d.47, kv.12)

Comparative evaluation of pneumonectomy and partial resection
in lung cancer. Vop.onk. 9 no.2:34-41'63. (MI:A 16:9)

1. Iz Instituta serdechno-sosudistoy khirurgii (dir. - prof.
S.A.Kolesnikov; nauchnyy rukovoditel' - akademik A.N.Bakulev)
AMN SSSR.

(LUNGS--CANCER) (LUNGS--SURGERY)

KHYMOVA, K.B.; BYKOVA, V.A.; PIROGOV, A.I.

Bronchial tree after partial resections of the lungs. Report No.1.
Grud. khir. 6 no.4:83-88 JI-Ag '64. (MIRA 18-4

1. Institut serdechno-sosudistoy khirurgii AMN SSSR (dir. - prof.
S.A.Kolesnikov, nauchnyy rukovoditel' - akademik A.N.Bakulev),
Moskva. Adres avtorov: Moskva V-49, Leninskiy prospekt, d.8,
Institut serdechno-sosudistoy khirurgii.

PIROGOV, A.I.; KAZNIN, V.I. (Moskva)

Air embolism of the vessels of the brain in lung surgery.
Grud. khir. 6 no.1:107-109 Ja-P '64. (MIRA 18:11)

1. Adres Kaznina: Moskva, V-49, Leninskiy prospekt, dom 8,
Institut serdechno-sosudistoy khirurgii.

1. PROGOV, A.I.; K. I. ...

...
onk. 10 no. 2116-114 ...

... iz Moskovskoy perodskoy onkologicheskoy bol'nitsy ...
(glavnyy vrach - V.F. Margolin i torakal'noy onkologicheskoy ...
dotor med. nauk B. G. Peterson Institut eksperimental'noy ...
klinicheskoy onkologii (dir. deystvite l'nyy nauchnyy ...
prof. R. N. ... A.N. SSSR. ... avtorov: ...
... ... Institut eksperimental'noy i klinicheskoy
onkologii A.N. SSSR, i-oye khimicheskoye otdeleniye.

PIROGUY, ...

and ... for ... in ... (MIRA 16:18)

... - doktor ...
Inst ...
... N.Y. ...

PIRGUY, II

PHASE I BOOKS, 1973

Vasopromoye sozvezheniye po fizike, khimii i tekhnologii ferritov i fizicheskii asosov lan primeneniya. M., Minsk, 1973
 Ferrity; fizicheskiye i fiziko-khimicheskiye svoystva. Dva. 4. 47
 (Ferrites; Physical and Physicochemical Properties. Reports)
 Minsk, Izd-vo AN BSSR, 1970. 655 p. Errata slip inserted
 4,000 copies printed.

Sponsoring Agencies: Nauchnyy sovet po magnetizmu AN SSSR. Otdel.
 fiziki tverdogo tela i poluprovodnikov AN BSSR.

Editorial Board: Resp. Ed.: N. N. Sirota, Academician of the
 Academy of Sciences BSSR, K. P. Belov, Professor, Ye. I. Kondor-
 atskiy, Professor, A. M. Polyanov, Professor, R. V. Tselarin, Pro-
 fessor, G. A. Zhukovskiy, Professor, M. Sholits, Candidate of
 Physical and Mathematical Sciences, E. M. Zhukovskiy, and
 L. A. Makhitov; Ed. of Publishing House: S. M. Zhukovskiy, Tech-
 Ed.: I. Volokhanovich.

NOTE: This book is intended for physicists, physical chemists,
 radio electronics engineers, and technical personnel engaged in
 the production and use of ferromagnetic materials. It may also
 be used by students in advanced courses in radio electronics,
 physics, and physical chemistry.

CONTENTS: The book contains reports presented at the Third All-
 Union Conference on Ferrites held in Minsk, Belorussian SSR.
 The reports deal with magnetic transformations, electrical, and
 microwave properties of ferrites, studies of the growth
 of ferrite single crystals, problems in the chemical and physico-
 chemical analysis of ferrites, studies of ferrites having
 rectangular hysteresis loops and multicomponent ferrite systems
 exhibiting spontaneous magnetization, problems in magnetic
 attraction, highly coercive ferrites, magnetic spectroscopy,
 ferromagnetic resonance spectroscopy, physical principles of
 using ferrite components in electronic circuits, anisotropy of
 electrical and magnetic properties, electrodynamic properties of
 ferrites, AN BSSR (S. V. Yemashov), Chairman, Committee on Mag-
 netism. References accompany individual chapters.

SOV/1993

Ferrites (Cont.)

- Shanayev, Yu. M., A. I. Belykh, and G. P. Lisitsyn
 Method and Results of an Experimental Study of the
 Dynamic Characteristics of Pulsed Reversal of Magnetiza-
 tion of Ferrites 409
- Mardizh, V. V. and V. V. Kozlov, Computation of Curves of
 the Reversal of Magnetization of Ferrite Cores 423
- Shanayev, Yu. M. The Relationship Between Static and
 Dynamic Characteristics of Ferrites During Pulsed Reversal
 of Magnetization 437
- Syrin, L. M., M. A. Shumakov, and G. V. Fyagina The
 Pulse Method of Studying Magnetostrictive Oscillations in
 Ferrites 441
- Kupriyakov, I. K., and D. I. Mironovskiy Magnetic Analog
 of the Dielectric Film of Southworth 451

Card 13/18

100 4/18

PHASE I BOOKS EXP. 1971-72

Vsesoyuznoye soveshchaniye po fizike, fizika antiferromagnetizma i fizika ferritov i fizicheskaya osnovaniya iuh primeneniya. M., Mir, 1970. Ferrity: fizicheskiye i fiziko-khimicheskiye svoystva. Dodel's (Ferrites: Physical and Physicochemical Properties Reports. Kinsk, Izd-vo AN SSSR, 1960. 955 p. Errata slip inserted. 4,000 copies printed.

Sponsoring Agencies: Nauchnyy sovet po magnetizmu AN SSSR. Utdel fiziki tverdogo tela i poluprovodnikov AN SSSR.

Editorial Board: Resp. Ed.: M. M. Sirota, Academician of the Academy of Sciences USSR, K. P. Belov, Professor, Ye. I. Kondraty, Professor, K. M. Polivanov, Professor, M. V. Telser, Professor, I. G. Spolenskiy, Professor, M. M. Shol'ts, Certificate of Physics, and Mathematical Sciences, I. M. Zhukovskiy and I. A. Mashkevich, Ed. of Publishing House, S. Kholyavskiy, Tech. Ed.: I. Volokhanovich.

PURPOSE: This book is intended for physicists, physical chemists, radio electronics engineers, and technical personnel engaged in the production and use of ferromagnetic materials. It may also be used by students in advanced courses in radio electronics, physics, and physical chemistry.

CONTENTS: The book contains reports presented at the Third All Union Conference on Ferrites held in Minsk, Belorussian SSR. The reports deal with magnetic transformations, electrical and galvanomagnetic properties of ferrites, studies of the growth of ferrite single crystals, problems in the chemical and physical analysis of ferrites, studies of ferrites having different structures, spontaneous rectangularity, problems in magnetic attraction, highly coercive ferrites, magnetic spectroscopy, ferromagnetic resonance, magneto-optics, physical principles of using ferrite components in electrical circuits, anisotropy of electrical and magnetic properties, etc. The Committee on Magnetism, AN SSSR (S. V. Yoncoskiy, Chairman), organized the conference. References accompany individual articles.

Ferrites (Cont.)

SOV/AS93

Suboleva, L. P., and Yu. M. Kolli. Dynamics of the Reversal of Magnetization of a Ferrite Bar with a Rectangular Cross Section. 364
Brin, I. A., G. P. Lisitsyn, and Yu. M. Shumayev. The Surface Effect in a Ferrite Plate with Rectangular Hysteresis Loop. 377
Shumayev, Yu. M. Stability of Particular Cycles and "Accommodation" During Pulsed Reversal of Magnetization of Ferrites with Rectangular Hysteresis Loop. 404
Shumayev, Yu. M., A. I. Kirovskiy, and V. P. Belyavskiy. Pulsed Reversal of Magnetization of Ferrites with Rectangular Hysteresis Loop. 401
Rabkin, L. I., and B. Sh. Spenteyn. Ferrites with Rectangular Hysteresis Loop in weak Fields. 401

Card 12/18

Card 4/18

LAMAN, Nikolay Konstantinovich; SHUKHARDIN, S.V., otv. red.;
PIROGOV, A. I., red.; PROKOP'YEVA, N.B., red. izd-va;
MAKUNI, Ye.V., ~~tekhn.~~ red.

[Development of metal drawing techniques] Razvitie tekhniki volocheniia metallov. Moskva, Izd-vo AN SSSR, 1963.
233 p. (MIRA 16:10)

(Drawing (Metalwork))

KOPORENIY, A.. (Moskva); PIROGOV, A.I. (Moskva); SHAMAYEV, Yu.M. Moskva

Dynamic characteristics of magnetic cores with rectangular
hysteresis loop and their analytical description. Avtom. i telem.
(MIRA 17:1:1)
no.10:1502-1510 0 1964.

PILOGOV, Arkadiy Ivanovich; S K A EV, Yuriy Lvovych;
TASHUKANIS, P.Ye., kandyd. tekhn. nauk, kate.

Magnetic cores with rectangular hysteretic loops; static and dynamic characteristics, methods for measurement and control, and principles of aerodynamic networks with cores having rectangular hysteresis loops; laskitnye servechniki s pramoougol'nymi kharakteristikami; staticheskie i dinamicheskie kharakteristiki, metody izmereniya i kontrolya, osnovy rascheta i upravlenniya servechniki s PFG. Moskva, Izd-vo "Mashinostroyeniye", 1975 g. (MIRA 17:9)

PIROGOV, A.K.

Eliminate idling of electric motors for individual separators
on spinning looms. Prom.energ. 15 no.2:20 P '60.

(MIRA 1):5)

(Electric motors) (Looms)

PIROGOV, A.M.; TUZOV, L.V.

Investigating the vibration and noise of the ChTZ tractor
diesel engines. Trakt. i sel'khoz mash. 33 no.10:8-12 0 '63.
(MIRA 17:1)

1. Tsentral'nyy nauchno-issledovatel'skiy dizel'nyy insti-
tut.

ALEKSEYEV, Ye.K., inzh.; IZGUR, R.M., inzh.; LYUKS, Ye.P., inzh.; NIKO-
LAYEVSKIY, Ye.Ya., inzh.; PIROGOV, A.N., inzh.; RODIONOVA, R.G.,
inzh.; TOYBIN, V.A., inzh.; FREYDLIN, G.M., inzh.; KHLIUPINA,
A.K., inzh.; CHERNOV, D.L., inzh.; BYDEL'MANT, L.B., inzh.; ZHMUR,
N.S., inzh., retsenzent; MOLYUKOV, G.A., inzh., red.; TIKHANOV,
A.Ya., tekhn.red.

[Production and installation of pipe systems; reference manual]
Izgotovlenie i montazh tekhnologicheskikh truboprovodov; spra-
vochnoe posobie. Moskva, Gos.nauchno-tekhn.isd-vo mashinostroit.
lit-ry, 1960. 574 p. (MIRA 13:7)
(Pipe fitting)

SOV-10-10-75-1

AUTHORS: Fodosenov, A.F., Fozilyayev, L.I. and Virogov, A.I.

TITLE: Diesel Locomotives for Narrow-Gauge Railroads (Topol'nyy uzkokoleynyykh zheleznykh dorog)

PERIODICAL: Mekhanizatsiya trudoyemkikh i tyazhelykh rabot, 1950, No. 1, pp 15-18 (USSR)

ABSTRACT: Diesel locomotives possess many advantages over steam locomotives, particularly in the lumber and peat industries. The laboratoriya rel'sovogo transporta Tsentral'nogo nauchno issledovatel'skogo instituta mekhanizatsii i energetiki lesnoy myshlennosti - TsNIIME (Rail Transportation Laboratory of the Central Scientific Research Institute of Timber Industry, Mechanization and Power Engineering) has carried out experiments on this subject. In collaboration with the Olenokskiy mashinostroitel'nyy zavod (the Olenok Machine Building Plant, TsNIIME developed a narrow-gauge diesel locomotive in 1956, the TU-1, a four-axle locomotive with a centrally situated cab, coupling weight 17.8 tons, traction force - 2,750 kg, distance between pintles - 3,200 mm, diameter of wheels - 750 mm, maximum speed - 30 km per hour. The locomotive is equipped with electric, pneumatic and hand brakes. Another narrow-gauge diesel locomotive

Card 1/2

Diesel Locomotives for Narrow-Gauge Railroads

SV-V-11.8 5. 7. 5. 20

with hydro-mechanical transmission, the TU⁸-4, was designed and constructed by the Arkhangel'skiy lesotekhnicheskii institut (the Arkhangel'sk Institute of Forest Engineering). The diesel engine of the type YAAZ-204A (110 hp) was designed and constructed by the Arkhangel'sk Institute of Forest Engineering. The coupling weight of the locomotive - 16 tons, distance between pintles - 4,000 mm, diameter of wheels - 600 mm, tractive force at a speed of 4.5 km per hour - 3,800 kg, maximum speed 28.5 km per hour. In cooperation with the Votkinskiy mashinostroitel'nyy zavod (the Votkinsk Machine Building Plant) the TsNIIR has also developed a narrow-gauge diesel locomotive with hydro-mechanical transmission gearing (TU⁸-4) on the base of the YAAZ-206 diesel engine of 165 hp; coupling weight - 18 tons, distance between pintles - 4,260 mm, diameter of wheels - 800 mm, tractive force - 4,500 kg, maximum speed - 38.6 km per hour. The locomotive is equipped with automatic and hand brakes. The TU⁸-4 is said to be the most suitable diesel locomotive for timber transportation. The article presents a detailed technical description of this unit. There are 2 photos, 1 technical drawing and 1 table.

1. Locomotives--USSR 2. Diesels--Applications

Card 2/2

PIROGOV, A.V., inzh.

Automatic differential shielding in case of the breaking of the
delivery conduit of a hydroelectric power station using semi-
conductor heat-transmitters. Gidr. stroi. 32 no.3:41-43 Mr '62.
(MIRA 16:7)

(Hydroelectric power stations)

PIROGOV, A.V., inzh.

Apparatus for the control of closing and setting of double-
walled sluice gates. Rech.transp. 17 no.11:42-44 B '58.
(MIRA 11:12)

(Gates, Hydraulic)

PIROGOV, A.V., inzh.

Elimination of vibrations in the hydraulic lift of a gate valve
in a water tunnel. Gidr.stroi. 31 no.8:35-36 Ag '61. (MIRA 14:8)

(Hydraulic machinery—Vibrations)
(Kremenchug Hydroelectric Power Stations—Valves)

PIROGOV, B.I.

Mineralogy of magnetite hornfels in the Southern Mine and
Ore Dressing Combine. Zap. Ukr. otd. Min. ob-va [no.1]:23-
96 '62. (MIRA 16:8)

1. Yuzhnyy gornobogatitel'nyy kombinat, Krivoy Rog.

ARTEMOVA, A.A.; PIROGOV, P.I.; GORBATOVA, V.Ya.

Dependence of ore dressing indices in the Krivoy Rog Southern
Mining and Ore Dressing Combine on ore composition and structure
Obog. rud. no. 6: 7-14 '61. (MIRA 1: 1)

1. Yuzhnyy yornotoratitel'nyy kombinat.
(Krivoy Rog basin--Ore dressing) (Iron ores--Analysis)

PIROGOV, B.I.

Composition, structure, and enrichment of ferruginous minerals of
hornblendes in the Skelevyy magnetite deposit of the Krivoy Rog
Basin. Sov.geol. 5 no.8:122-134 Ag '62. (MIRA 15:9)

1. Krivorozhskiy yuzhnyy gornopobogatitel'nyy kombinat.
(Krivoy Rog Basin—Hornblende)
(Krivoy Rog Basin—Magnetite)

PIROGOV, B.I., geolog-petrograf

Effect of geological and mineralogical factors on the main
technological properties of ferruginous chert. Gor. zhur.
no. 12:17-19 D '65. (MIRA 18:12)

1. Yuzhnyy gornoobogatite. 'nyy kombinat, Krivoy Rog.

PETRUN', V.F.; PIROGOV, B.I.

Formation of karst-suffosion caverns in iron ore rocks of the
Krivoy Rog Basin. Izv.vys.ucheb.zav.; geol. i razv. 5 no.5:26-33
My '62. (MIRA 15:6)

1. Krivorozhskiy gornorudnyy institut.
(Krivoy Rog Basin--Caves) (Krivoy Rog Basin--Karst)

VAGIN, V.V., inzh.; PIROGOV, B.I., inzh.

Use of iron foundry shops for the production of shaped stone
castings. Lit. proizv. no. 12:37-39 D '60. (MIRA 13:12)
(Foundries) (Stone, Cast)

VAGIN, Viktor Vasil'yevich; PIROGOV, Boris Ivanovich; BARINOV, N.A.,
kand.tekhn.nauk, retsenzent; SIROTIN, A.I., inzh., red.;
VLADIMIROVA, L.A., tekhn.red.

[Stone casting] Kamennoe lit'e. Moskva, Mashgiz, 1962.
93 p.

(Stone)

(MIRA 15:4)

VAGIN, V.V., inzh.; PIROGOV, B.I., inzh.

Diabase and amphibolite stone casting. Gor. zhur. no.4:61-63
Ap '60. (MIRA 14:6)

1. Yuzhnyy gorno-obogatitel'nyy kombinat, Krivoy Rog.
(Diabase) (Amphibolite)
(Stone, Cast)

L 37642-66 EWT(m)/T DN
ACC NR, AP6021823

SOURCE CODE: UR/0413/66/000/012/0118/0118

INVENTOR: Kaptsan, D. Kh.; Pirogov, B. V.; Yeletin, V. S.

ORG: none

TITLE: Brake-clutch. Class 47, No. 182983 [announced by the Experimental Scientific Research Institute of Forging and Pressing Machine-Building (Eksperimental'nyy nauchno-issledovatel'skiy institut kuzhechno-pressovogo mashinostroyeniya)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 12, 1966, 118

TOPIC TAGS: clutch, brake

ABSTRACT: An Author Certificate has been issued for a brake-clutch consisting of a flywheel, a single-disk pneumatic friction coupling comprising a spring-loaded disk

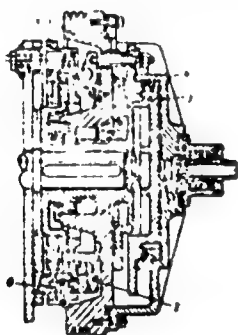


Fig. 1. Brake-clutch

1 - Flywheel; 2 - spring-loaded disk; 3 - piston;
4 - cylinder; 5 - sliding disk; 6 - rollers.

Card 1/2

UDC: 621.825.54:62-592.52

L 77647-56

ACC NR: AP6021823

and piston with a pneumatic cylinder, and a single-disk friction brake with a sliding disk (see Fig. 1). To provide compactness and design simplicity with a small bracket, to raise operating reliability and improve operating conditions, and to increase the number of possible engagements, conical rollers, connected through a spring-loaded disk to the pneumatic-cylinder piston, are mounted on the brake's sliding disk. Orig. art. has: 1 figure. [WH]

SUB CODE: 13/ SUBM DATE: 08Feb65/ ATD PRESS: 5048

Card 2/2 vmb

PIROGOV, D.M.; podpolkovnik yustitsii

Supplementary leaves of absence and the working day. Voen.-med.
zhur. no.8:95-96 Ag '61. (MLA 15:2)
(MEDICAL PERSONNEL, (LEAVE OF ABSENCE)

PIROGOV, D.M., podpolkovnik yustitsii

Pensions for prolonged meritorious service for physicians and other
medical and pharmaceutical personnel. Voenn.-med. zhurnal, no.8:94-95
Ag '60. (MIRA 14:7)

(MEDICAL PERSONNEL—PENSIONS)

GOLOSOV, S.I., inzh.; PIROGOV, G.S., inzh.; AVRUTIN, V.S., inzh.

Crushing of coal during its transfer to lower levels through chutes.
Ugol' 34 no.9:45-46 S '59. (MIRA 12:12)

1.Kuzbassgiproskht.
(Coal handling)

PIROGOV, I.

USSR

President, Organizing Committee of the City Executive
Committee, Stalinskiy district.
On-Amur Steel Plant; house of Rest; Sanatorium
N; Stalinskiy Komsomol'Sk 7 July 1945

SOURCE:

Abstracted in UCAF "Treasure Island" Report No.
57307, on file in Library of Congress, Air
Information Division.

PIROGOV, I.

Incapable hand: Sov.shakht. 10 no.3:7-8 Mr '61. (MIRA 14:7)

1. Shakhta imeni Rumyantsova, g. Gorlovka.
(Coal mines and mining)

PIROGOV, I.I., inzh.; GAYSEKOV, A.A., inzh.; GORBUSHIN, A.I., inzh.;
GLOZMAN, M.K., inzh.

Raising ships onto inclined longitudinal slips. Sudostroenie
24 no.7:57-59 J1 '58. (MIRA 11:9)
(Ships--Maintenance and repair)

"APPROVED FOR RELEASE: 07/13/2001

CIA-RDP86-00513R001341010015-5

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CIA-RDP86-00513R001341010015-5"

PIROGOV, I.M. [Pyrohov, I.M.]

Bending of a cylindrical plate with reinforced hole. Dop. AN
URSR no.9:1136-1139 '61. (MIR 14:11)

1. Vsesoyuznyy zaochnyy politekhnicheskii institut. Predstavleno
akademikom AN USSR G.N. Svinym [Savin, H.M.].
(Strains and stresses)

PIROGOV, I.M., kand.tekhn.nauk, dotsent

Stress concentration near a reinforced hole on the surface of a
circular cylinder. Izv.vys.sheeb.zav.; mashinostr. no.11:15-21
'61. (MIRA 14:12)

1. Vsesoyuznyy zaochnyy politehnicheskii institut.
(Elastic plates and shells)

PIROGOV, I.M.

Bending of a cylindrical shell. Izv.vys.ucheb.zav.; sv.tek.
3 no.1:68-71 '60. (MIRA 13:5)

1. Vsesoyuznyy nauchnyy politekhnicheskiy institut. Kafedra
soprotivleniya materialov i stroitel'noy mekhaniki.
(Elastic plates and shells)

PIHOGOV, I.M. (Moskva)

Concentration of stresses in the area of a hole in the surface of a cylindrical shell. Izv.AN SSSR, Otd.tekh. nauk. Mekh. i mashinostr. no.3:190-192 My-Je 1961.

(Kl. 1 : 1)

(Elastic plates and shells)

24.4100 29.1000 131000

69319
S/147/60/000/01/008/018
E031/E535

AUTHOR: Pirogov, I. M.

TITLE:

PERIODICAL: On a Particular Case of Bending of a Cylindrical Shell
Izvestiya vysshikh uchebnykh zavedeniy, Aviatsionnaya
tekhnika, 1960, Nr 1, pp 68-71 (USSR)

ABSTRACT: In earlier work (Nr 3, 1959 of the same journal) the solution of the problem of the stress distribution in the neighbourhood of a small hole in the surface of a cylindrical plate experiencing torsion and shear was considered. In this paper the solution is discussed of the problem of the stresses in a cylindrical shell near a hole, which is reinforced by a rigid ring, by the same method. The loading on the shell is a moment applied to the rigid ring in the axial meridional plane of the cylinder. It is assumed that the boundary of the hole remains undeformed. The solution given is approximate and suitable for small holes. The earlier derived solution for the complex stress function is used. The constants in this expression are determined from the

Card 1/2

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S/147/60/000/01/008/018
EO31/E535

On a Particular Case of Bending of a Cylindrical Shell

conditions of attachment of the ring to the shell. Thus, the bending and twisting moments and the normal and shearing forces can be obtained. The paper concludes with a numerical example. There are 3 references, all of which are Soviet, one being a translation of an English textbook.

ASSOCIATION: Kafedra soprotivleniya materialov i stroitel'noy mekhaniki, Vsesoyuznyy zaochnyy politekhnicheskii institut (Chair on Strength of Materials and Structural Mechanics, All Union Correspondence Polytechnical Institute)

SUBMITTED: September 24, 1959

Card 2/2

PIROGOV, I.M. (Moskva)

Stress concentration around a reinforced hole in a cylindrical
tank filled with a liquid. Prikl. mekh. 1 no.1:119-121 '65.

i. Vsesoyuznyy zaochnyy politekhnicheskiy institut.

88533

S/179/60/000/006/032/036
E031/E135

10 9100

AUTHOR: Pirogov, I.M., (Moscow)
TITLE: The Stressed State in a Cylindrical Shell with a Reinforced Hole
PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Mekhanika i mashinostroyeniye, 1960, No. 6, pp. 166-168

TEXT: In Ref.1 an approximate solution was given of the problem of the stress distribution in the neighbourhood of a soldered elastic ring on the side surface of a cylindrical shell. The same method is used in the present note for the case in which the hole is reinforced by an elastic ring of the same thickness as the shell, but of a different material. Quantities of the order of $2 = \sqrt{3(1-\nu^2)}/4ah$

(ν is Poisson's coefficient, a and h are the radius and thickness of the shell respectively) are neglected. The arbitrary constants in the expression for the stress function are
Card 1/2

88533

S/179/60/000/006/032/036
E031/E135

The Stressed State in a Cylindrical Shell with a Reinforced Hole determined from the boundary conditions and the coupling condition of the ring to the shell (there are no external forces and the ring is soldered into the hole of the shell). In terms of the stress function, which is quoted, and the arbitrary constants, whose evaluation is indicated, the forces in the shell and ring can be determined. Known solutions are obtained by suitable passages to the limit. As an example the effect of the rigidity of the reinforced ring on the stress in the case of a cylindrical reservoir under constant internal pressure is discussed. As the rigidity increases the stress intensity decreases. In conclusion it is stated that the same method can be used when the ring is of the same material as the shell, but is thicker. There are 1 table and 3 Soviet references.

SUBMITTED: February 20, 1960

Card 2/2

L 16587-63

EMP(r)/EMP(q)/EMP(m)/BDS AFFTC/ASD/JD/HM

56

S/145/62/000/012/001/011

AUTHOR: Pirogov, I. M., Docent, Candidate of Technical Sciences

TITLE: On stresses in a cylindrical casing containing a hole into which an elastic ring has been pressed.

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Mashinostroyeniya, no. 12, 1962, 5-13

TEXT: The article discusses an approximate solution of the problem of extension in a cylindrical casing, weakened by a hole into which an elastic ring has been pressed.

To solve this problem, the author uses approximate equations dealing with thin-walled, circular cylindrical casings in semi-geodetic coordinates.

The author considers three special cases corresponding to modular ratios E_2/E_1 of 0, 0.5 and 2, where E and E_1 are the moduli of elasticity of the casing and the elastic ring, respectively. The numerical results lead to these conclusions:

Card 1/2

L 16587-63

0
S/145/62/000/012/001/011

On stresses in a cylindrical casing...

- 1) The maximum normal stresses in a cylindrical casing are practically identical with those in a comparable flat plate.
- 2) While in the case of a flat plate, the maximum normal stresses are independent of the type of material used in the plate and the ring, in the case of a cylinder stresses decline somewhat as the rigidity of the ring increases. In the limiting case when the ring has absolute rigidity (i.e. when $E = 0$), the drop in the stress concentration factor for stresses uniformly distributed throughout the thickness of the cylinder is on the order of 9%.
- 3) Other stresses--such as the bending moment--also can be computed, but tests have proved that their numerical value is very low as compared with that of uniformly distributed stresses.

SUBMITTED: June 13, 1961

Card 2/2

PIROGOV, I.M., kand.tekhn.nauk, dotsent

Bending of a cylindrical plate having a hole with edges
reinforced by an elastic ring. Izv.vys.ucheb.zav.; mas.inostr.
no.4:38-44 '62. (MIRA 15:7)

.. Vsesoyuznyy nauchnyy politekhnicheskii institut.
(Elastic plates and shells)

42762

3/245/62/000/000/005/005
0234/0300

Author: Petrov, I.I., Candidate of Technical Sciences,
Docent
Title: Approximate solution of the basic differential equation in the theory of cylindrical shells
Source: Investiya vysshim uchebnykh zavedeniy, Mashinostroyeniye, no. 6, 1962, 137-145

The homogeneous problem of stressed state is described by the well-known approximate complex equation of the fourth order. Its solution contains functions introduced by A.M. Lylev and a function satisfying

$$\Delta^2 + 2\Delta - 2 = 0 \quad (3)$$

The solution of the latter in semi-geodesic coordinates φ, θ is

$$u_n = A_n(\varphi) \cos n\theta, \quad v_n = B_n(\varphi) \sin n\theta \quad (4)$$

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approximate solution ...

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where ϵ satisfies the condition. The author takes the solution
on ϵ given by Kharin's method of the first kind. From the usual
transformations of Krylov's and Lur'e's functions, the author obtains
an integral for the str... function in the case of small ϵ by re-
garding, thus.

Author: /Institute of Applied Mechanics, Leningrad Polytechnic Institute
(Leningrad Polytechnic Institute)

April 13, 1961

Card 1/1

L 13856-66 EWT(d)/EWT(m)/EWP(w)/EWP(v)/EWP(k)/EWA(h)/ETC(m) LJP(c) WH/EM
ACC NR: AP6002343 SOURCE CODE: UR/0198/65/001/012/0116/01:9

AUTHOR: Pirogov, I. M. (Moscow)

ORG: All-Union Correspondence Polytechnic Institute (Vsesoyuznyy zaochnyy politekhicheskii institut)

TITLE: The effect of curvature on the stress distribution around an opening in a cylindrical shell

SOURCE: Prikladnaya mekhanika, v. 1, no. 12, 1965, 116-119

TOPIC TAGS: stress analysis, shell, cylindrical shell, stress computation

ABSTRACT: A solution of the problem of stress concentrations in the region of a small opening in the surface of a thin-walled circular shell is obtained. The article is partly based upon an approximate solution of the same problem worked by A. N. Krylov (O raschete balok, lezhashchikh na uprugom osnovanii, Izd-vo AN SSSR, 1933). A statement of the problem is as follows: an opening of radius $\rho = \text{const}$ is located on the surface of a thin-walled circular cylindrical shell. In an "unfolded," planar position the radius of the opening is ρ_0 . The stressed state of the shell in the absence of an opening is given by the membrane forces

$$S_x^0 = \rho h; \quad S_y^0 = qh; \quad S_{xy}^0 = 0;$$

where x and y are coordinates with origin at the center of the opening. A partial solution of the basic differential equation is given by

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ACC NR: AP6002343

$$\overline{\Psi}_n = (\alpha_n + i\beta_n) \cos n\theta \quad (n = 0, 1, 2, \dots),$$

where

$$\alpha_n = K_1 \psi_n + 2K_2 \chi_n;$$

$$\beta_n = K_1 \chi_n - 2K_2 \psi_n;$$

$$\alpha_n = K_2 (\psi_n - \chi_n) + 2K_1 (\psi_n + \chi_n);$$

$$\beta_n = K_2 (\psi_n + \chi_n) - 2K_1 (\psi_n - \chi_n).$$

In these equations n is an integer, except in the last equation where it is a non-integer. K_j is a function defined by A. N. Krylov (op. cit), and

$$H_n^{(1)}(\beta_0 \sqrt{2i}) = \psi_n(\beta_0) + i\chi_n(\beta_0).$$

Series expansions for the α and β coefficients are found; for example

$$\alpha_0 = -\frac{\beta_0^2}{3\pi} \left(6 \ln \frac{\gamma \beta_0}{\sqrt{2}} - 3 + 2 \cos^2 \theta \right) \cos \theta + \frac{\beta_0^4}{24} (3 + 4 \cos^2 \theta) \cos \theta + \dots;$$

$$\beta_0 = \left[-\frac{2}{\pi} + \frac{\beta_0^2}{2} + \frac{\beta_0^4}{\pi} \left[\left(\frac{1}{2} + \frac{2}{3} \cos^2 \theta \right) \ln \frac{\gamma \beta_0}{\sqrt{2}} - \frac{5}{8} - \frac{1}{3} \cos^2 \theta + \frac{1}{16} \cos^4 \theta \right] \right] \cos \theta + \dots$$

The complex stress function with the presence of the aperture is

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ACC NR: AP6002343

$$\Phi = \sum_{n=0}^{\infty} (A_n + iB_n)\Phi_n$$

where A_n and B_n are constants of integration. Membrane stress equations are written, and the means of evaluating constants of integration described. The stress equations found are accurate to the fourth order of the $\rho\rho$ parameter. The study indicates that for this type of problem shear stresses do not have an appreciable effect on the value of the stress concentration coefficient. Orig. art. has: 9 equations.

SUB CODE: 20/ SUM DATE: 26Apr65/ ORIG REF: 007

Cont 3/3 *BC*

PIROGOV, I.M., kand.tekhn.nauk, dotsent

Approximate solution of the basic differential equation in the theory of cylindrical shells. Izv.vys.ucheb.zav.; mashinostr. no.6:137-145 '62. (MIRA 15:11)

1. Vsesoyuznyy zaochnyy politekhnicheskii institut.
(Elastic plates and shells)
(Differential equations)

30317

S/145/61/000/007/001/009
D221/D301

10 6000 13.7 2617 4512

AUTHOR Pirogov, I. M., Candidate of Technical Sciences, Docent

TITLE Formation of a cylindrical shell with a reinforced hole on its lateral surface

PERIODICAL Izvestiya vysshikh uchebnykh zavedeniy. Mashinostroyeniye, no. 7, 1961, 9-14

TEXT The author considers a cylindrical shell with a hole of radius a in its lateral surface, with a ring with internal diameter D_1 welded into it. The shell is subject to a torque M , at both ends, and the stress conditions in the ring as well as near it are determined. It is assumed that the thickness of the shell is small when compared to its diameter. The tangential stress in a shell without holes is uniformly distributed and equal to $\tau = M/2\pi a^2 h$, where a and h are the radius and thickness of the shell. The stresses in a shell with a reinforced hole are the same as in the case of a free aperture. Their approximate form

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Forging of a cylindrical ...

is given in "polar" (semi-geodetic) coordinates (φ and λ) of the surface of the shell, with the origin in the center of the hole. The coordinates x and y are referred respectively to the generatrix and the arc of the transversal circle of the cylinder. Two equations for the stress condition in the reinforcing ring are added. The approximate solutions are simplified and a set of equations for the stresses in the ring is deduced. The unknown coefficients C_0 , A_1' , C_0' ... for the shell and the ring are determined from the boundary conditions and the conditions of junction between the ring and the shell. As there are no external forces on the internal contour of the reinforcing ring, the normal and shear force together with the bending moment and the generalized transversal force of the area $\int'$ const. are zero. Since the ring is supposed to be welded to the shell, the forces, moments and displacements on the common boundary must be equal. The forces are expressed by the imaginary part of the stress function; the moments and the shear forces - by its real part. The tangential components of the displacements are expressed by the imaginary part of the stress function. Twelve equations for the unknown coefficients

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Torsion of a cylindrical ...

are obtained, from which the tangential components of the forces on the shell and the ring can be obtained. The author gives the expressions for the normal and shearing forces in the shell and those on the ring. The effect of the rigidity of the ring on the magnitude of the largest normal stresses is considered in a numerical example. The tabulated results demonstrate that an increase of the ring stiffness causes a decrease in the concentration of stresses. The author states that the formulas for bending stresses obtained by this method are very cumbersome even in a particular case and that calculations show that bending stresses can be essential for a free (reinforced) hole. Increase of the ring rigidity causes sharp decrease of bending stresses, as well as membrane stresses. He states that the obtained results can also be used for approximate calculations for cases, when the reinforcing ring is of the same material as the shell, but of greater thickness. There are 3 Soviet bloc references.

ASSOCIATION Vsesoyuznyy zaochnyy politekhnicheskiy institut (All Union Correspondence Polytechnic Institute)

SUBMITTED June 16, 1960
Card 3, 3

10256

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D221 D104

AUTHOR: Pirogov, I.M., Candidate of Technical Sciences,
Docent

TITLE: Torsion of cylindrical shell weakened by a hole

PERIODICAL: Izvestiya vysshih shkolnykh zavedeniy Mashinostroyeniye, no. 4, 1960, 78-81

TEXT: The distribution of stresses in a cylindrical shell welded to a rigid plate and subject to torsion is determined by the method of A.I. Bur'ye (Ref. 1: Statika tonkostennyykh spruzhnykh ob'ekтов (Statics of Thin Rigid Shells), Gostekhnizdat, 1947). The considered shell is weakened by a hole and is welded to a rigid plate of other material. It is subject to torsional torque M applied at its end. The stresses in the shell near the weld and in the plate are determined. Owing to small thickness of the shell in relation to its radius, the tangential stresses sufficiently far away from the hole are regarded as uniformly distributed over the thickness of shell. This simplifies the solution to that of a cylindrical

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Torsion of cylindrical shell ...

plate loaded with shearing forces, $S = \tau h$, uniformly distributed over the contour. The author quotes an approximate solution applicable to a small hole. The surface of the cylindrical shell is referred to polar (semi-geodesical) coordinates ρ and λ , with the origin at the center of the hole. The complex functions of stresses in the shell and plate are quoted. The normal and shear stresses are expressed by the imaginary part, whereas moments and the twisting forces are indicated by the real part of stress function. The tangential displacements u and v are then expressed by a stress function. The approximate equations for components of stresses in deformations of cylindrical surface referred to polar coordinates coincide with equations of similar moments in a plate under the condition of flat deformation. Expressions for moments are obtained in closed form and this allows calculation of all components of stresses. The author considers some particular instances of an absolutely rigid plate, the case of infinitely rigid plate and finally allows for curvature. The computations indicate that the increase in stresses requires the concentration of stresses in the plate and in the shell. When the rigidity of plate is taken into account, the

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Torsion of cylindrical shell.

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shell, the effect of shell curvature on maximum stress is significant. There are 1 table and 1 Soviet plus references.

ASSOCIATION: Vsesoyuznyy nauchnyy i tekhnicheskoy institut A. I. Union Correspondence Polytechnic Institute.

SUBMITTED: November 1, 1961

Card 1 1

PIKULOV, I.M., kand. tekhn. nauk, docent

Stress concentration in a hole in a cylindrical tank subjected to hydrostatic pressure. Izv. vys. ucheb. zav. mashinostr. (MIRA) 1963, no. 7:56-61, 163.

1. Vsesoyuznyy nauchnyy tekhnicheskii institut.

PIROGOV, I.N., kand.tekhn.nauk, dotsent

Torsion of a cylindrical plate with a hole reinforced with a flexible ring along its edge. Izv. vys. uchet. zap.; mashinost. no.6:75-81 '61. (MIRA 14.7)

1. Vsesobornyye tekhnicheskoye sostoyaniye. (Elastic plates and shells)

PIROGOV, I.M., kand.tekhn.nauk, dotsent

Torsion of a cylindrical shell having a reinforced side hole.
Izv.vys.ucheb.zav.; mashinostr. no.7:9-14 '61. (MIRA 14:9)

1. Vsesoyuznyy zaochnyy politekhnicheskii institut.
(Elastic plates and shells)

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The stress concentration near ...

$$\begin{aligned}
 M_1 = & - \frac{E h^3}{8 \pi R \sqrt{12(1-\nu^2)}} \left\{ 2(2A_0 - C_0) \left[(1+\nu) \ln \frac{1 \beta \rho}{\sqrt{2}} + \nu \right] \right. \\
 & - (1+\nu) \frac{C_0}{2} - 2(1-\nu) \frac{B_1}{\rho^2} + \\
 & + \left\{ (A_0 - C_0) \left[1 + 3\nu - 2(1-\nu) \ln \frac{1 \beta \rho}{\sqrt{2}} \right] - (1-\nu) \frac{C_0}{3} - \right. \\
 & - \frac{4D_0}{\rho^2} + 12(1-\nu) \frac{E_2}{\rho^4} \left. \right\} \cos 2\lambda + \\
 & + \left\{ (7-\nu) \frac{C_0}{6} + \frac{8F_1}{\rho^2} + 24(3-\nu) \frac{H_1}{\rho^4} + (1-\nu) \frac{480M_2}{\rho^4} \right\} \cos 4\lambda \left. \right\}.
 \end{aligned} \tag{1.}$$

As it is cumbersome, further calculations are made for the case of
 $\nu = \nu_1 = \frac{1}{3}$, and $\rho = \rho_0$. The effect of rigidity of the reinforcing

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D221/D303

The stress concentration near ...

blank is then considered in a numerical example. The tabulated data demonstrate the following: The stress concentrations decrease with higher stiffness of blank. In the case of free hole, the uniformly distributed stresses in the shell are about 16% greater than the stresses in the blank. The stresses due to bending of the shell are 4% of those in the plate. In the case of a nondeformed spherical ($\xi=0$) the curvature of the shell has little effect on the stresses. However, the additional stresses due to bending form 34% of those in the plate. There are 1 table and 5 Soviet-bloc references.

ASSOCIATION: Vsesoyuznyy nauchnyy politekhnicheskii institut
Union Correspondence Polytechnic Institute,

DATE: January 11, 1961

Card 4/4

27939
S/145 '60/000/011/001 012
D223/D304

24 4260

AUTHOR:

Pirogov, I.M., Candidate of Technical Sciences.
Docent

TITLE:

Stresses in a cylindrical surface in the proximity of a hole under the influence of a concentrated force

PERIODICAL:

Izvestiya vysshikh uchebnykh zavedeniy Mashinostroyeniye no. 11. 1960. 3-7

TEXT In this paper the author presents a method for computing stress in a cylindrical surface assuming that the concentrated force is applied to the same point, but at right angles to the generatrix of the cylinder ("tangential" concentrated force). Using formulas developed by A.I. Lur'ye (Ref. 2: Statika tonkostennykh uprugikh obolochek / Statics of Thin-walled Elastic Surfaces / Gostekhnizdat, 1947) for computing the material and imaginary function of stresses with an accuracy up to a square

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D227, D304

Stresses in a cylindrical ...

of the small parameter $B = \sqrt{\frac{4}{3(1-\nu^2)}} \sqrt{ah}$ (ν = Poisson's coefficient), the author develops equations expressing this function of stresses which, however, fail to provide a solution for conditions when a tangential concentrated force is applied. The main part of the paper is dedicated to developing supplementary formulas for computing tangential components of stress in a cylindrical surface, including stresses due to the bending and twisting moments. A table of additional normal stresses occurring in the circumference of the hole which are due to the curvature of the surface (plate) is provided for various parameters α to show that the curvature of the surface has only an insignificant influence upon the stresses at the point located in the proximity of the point of application of the concentrated force and, consequently, may be neglected in practical computations. As regards other points, the presence of a curvature considerably influences the magnitude of the stresses. Thus, for $\alpha = 0.4$ in sections 2π , the stresses

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D223, D304

Stresses in a cylindrical ...

resulting from σ exceed their magnitude on a flat surface by approximately 6% while those resulting from M_A amount to 10% of the stresses occurring on a flat surface. Consequently due to the existence of a curvature in the investigated case the magnitude of normal stresses was increased by approximately 16%. There are 1 table and 1 Soviet-bloc reference

ASSOCIATION Vsesoyuznyy zaachnyy politekhnicheskiy institut
(All-Union Correspondence Polytechnical Institute)

SUBMITTED September 19 1964

Card 3.3

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S/145/61/000/005/003/ 09
D221/D306

AUTHOR: Pirogov, I.M., Candidate of Technical Sciences

TITLE: Stretch of cylindrical plate, weakened by a hole,
into which an elastic washer is pressed

PERIODICAL: Izvestiya vysshykh uchebnykh zavedeniy. Mashino-
stroyeniye, no. 5, 1961, 33 - 38

TEXT: It is assumed that in a cylindrical plate a hole is made with a contour that will have a round circle of radius ρ_0 when the cylinder is developed on a plane. An elastic washer of radius ρ_1 somewhat larger than ρ_0 , is then pressed in, where $\rho_1 - \rho_0 = \delta^*$ which is small and in the order of elastic displacement. Assuming that there is no friction, it is necessary to evaluate stresses in the washer and cylindrical plate, when the latter is stretched by forces $S_1 = ph$ along the generatrix. A solution is given for the case when $\rho_0/a \sim \sqrt{h/a}$, where a and h are the radius and thickness

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S/145/61/000/005/003/009
D221/D306

Stretch of cylindrical plate ...

of the plate. The surface of the cylindrical plate is referred to polar coordinates ρ and λ , with its zero in the center of the hole. The function that determines stresses in the cylindrical plate has the same form as for a plate with an unfilled hole, according to A.I. Lur'ye (Ref. 1: Statika tonkostennykh uprugikh obolochek (Statics of Thin Wall Elastic Shells), Gostekhizdat, 1947), and is expressed by

$$\begin{aligned} Im = & \frac{2}{\pi} A \ln \frac{\sqrt{\rho}}{2} \left(\frac{1}{\rho} C_1 + \frac{2}{\rho^2} F_1 \right) \cos 2\lambda + \\ & + \frac{3}{4} \left(\frac{2}{\pi} A \ln \frac{\sqrt{\rho}}{2} - \frac{1}{4} (2A - C_1) \right) \left(\frac{1}{4} (A_1 - C_1) \rho^2 + \right. \\ & \left. \frac{1}{\pi} C_1 + \frac{2}{\rho^2} F_1 \right) \cos 2\lambda + \dots + 3A_1, \\ Re = & \frac{1}{\pi} \left\{ A \rho^2 \left(2 \ln \frac{\sqrt{\rho}}{2} - 1 \right) + C_1 \rho^2 \left(-\frac{1}{4} \ln \frac{\sqrt{\rho}}{2} - 2B_1 \ln \frac{\sqrt{\rho}}{2} \right) \right. \end{aligned} \quad (1)$$

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Stretch of cylindrical plate ...

$$\begin{aligned} & \cdot \left[A_0 \rho^2 \ln \frac{3\rho}{2} + C_0 \rho^2 \left(\frac{1}{6} \ln \frac{3\rho}{2} \right) + D_0 \frac{2}{\rho^2} \right] \cos 2\theta \\ & - \left(\frac{1}{12} C_0 \rho^2 + \frac{1}{2} E_1 + \frac{4}{\rho^2} H_2 + \frac{24}{\rho^4} M_3 \right) \cos 4\theta + \dots \quad w_0 + 3^2 w_1 + \dots \end{aligned}$$

where $\rho^2 = \sqrt{3(1-\nu^2)}/4 \text{ ah}$, ν is the coefficient of Poisson, γ_0 the constant of Euler.

$$\begin{aligned} \text{Im } \tau' &= A' \rho^2 + (B'_0 \rho^4 + B' \rho^2) \cos 2\theta + (3)^2 [C'_0 \rho^6 + \\ &+ (F'_0 \rho^4 + F' \rho^2) \cos 2\theta] \\ \text{Re } \tau' &= (\beta) \rho^2 \left[\frac{1}{12} B'_0 \rho^4 + \frac{1}{4} (A' + B') \rho^2 + \right. \\ &+ \left. \left(-\frac{1}{8} B'_0 \rho^6 + K'_0 \rho^4 + K_1 \rho^2 \right) \cos 2\theta + L'_0 \rho^6 + L_1 \rho^4 \cos 4\theta \right] \\ &+ \dots \quad w'_0 + (3^2)^2 w'_1 + \dots \end{aligned}$$

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Stretch of cylindrical plate ...

gives the stresses in the washer. Solution of the latter agrees with equation

$$\Delta \sigma + 81 \mu^2 \frac{\sigma^2}{x^2} = 0$$

for a cylindrical shell, as described by A.I. Lur'ye (Ref. 1, cit.). Arbitrary constants A_0 , C_0 , A' ... of Eq. (1) and (2) are determined from the condition of the conjugation of washer and plate, and assuming $\rho_1 = \rho_0$ due to smallness of δ^* by

$$S_1 = S_2 = S_3 = S_4 = 0, \quad u = u', \quad w = w', \quad \delta = \delta'$$

$$M_1 = M_2, \quad Q_1 = Q_2 = 0, \quad w = w'$$

where $\mu = E/2(1 + \nu)$ is the modulus of shear, E is the modulus of elasticity. Conditions of Eq. (4) relate to tangent components of stresses and displacements, and are analogous to those used in the

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D221/D306

Stretch of cylindrical plate ...

problem of stretching a plate weakened by a hole into which an elastic washer is pressed. Conditions in Eq. (5) relate to bending components of stresses and displacements. It should be noted that stresses are expressed by the imaginary part, and the moments and inter-section forces, by part of the function. Tangent components of displacements for functions in Eq. (1) and (2) are expressed by the imaginary part of stress function. Further elaboration of Eq. (4) results in twelve equations which determine forces and the tangent components of displacement in the shell and washer. These expressions are usually cumbersome. Further calculation is made for the case when the Poisson coefficient concerning the shell and washer are identical. It results in a set of arbitrary constants given by

$$\begin{aligned} A_0 &= \frac{\pi \rho_0^2}{8 E h_1} p^2, & C_0 &= \frac{\pi \rho_0^2}{4 E h_1} p^2, & F_1 &= \frac{\pi \rho_0^4}{16 E h_1} p^2, \\ A' &= \frac{\rho a_1}{4 E h_1}, & B_0 &= \frac{\rho a_1 \rho_0^2}{4 E h_1}, & B' &= \frac{\rho b}{8 E h_1}, \end{aligned} \quad (7)$$

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Stretch of cylindrical plate ...

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D221/D306

$$A_1 = \frac{1}{8} \pi \rho_0^2 \left(\beta_1 - \frac{16 \beta_2}{D_1} \right) (2 A_0 - C_0), \quad C_1 = - \frac{1}{4} \pi \rho_0^2 \beta_1 (A_0 - C_0), \quad (7)$$

$$C' = - \frac{1}{4} \epsilon \left(a_1 + \frac{8 \beta_2}{D_3} \right) (2 A_0 - C_0), \quad F' = - \frac{1}{8} \epsilon b_1 (A_0 - C_0),$$

$$F_2 = - \frac{1}{16} \pi \rho_0^4 \beta_1 (A_0 - C_0), \quad F_0' = - \frac{1}{4} \epsilon a_3 \rho_0^2 (A_0 - C_0). \quad (7)$$

and further supplies the normal stresses, S_ρ and S_θ in the shell and washer respectively. In the absence of curvature, these expressions provide the magnitudes of corresponding forces in the plane problem of the theory of elasticity for an unlimited plate with a pressed-in round washer. In the contact between washer and plate there are no stresses possible, because the former is pressed into the hole and is not welded to the material of the plate. After further mathematical treatment

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28169

Stretch of cylindrical plate ...

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D221/D306

$$\delta \rightarrow k \frac{3(11\varepsilon + 19)}{8(5\varepsilon + 7)} \quad (11)$$

is obtained, where coefficient k takes into account the effect of curvature. Individual cases are then considered of an absolutely elastic washer, i.e. no washer is pressed into the hole, and an absolutely rigid washer. It should be noted that the curvature of plate somewhat reduces the coefficient of stress concentration. The equations permit in each specific case evaluation of the effect of curvature in the plate on the magnitude of stress-concentration coefficient. The computations indicate that bending stresses are small compared with the uniformly distributed stresses. There are Soviet-blcc references.

ASSOCIATION: Vsesoyuznyy zaochnyy politekhnicheskiy institut (A.-
Union Correspondence Polytechnical Institute)

SUBMITTED: May 25, 1960

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28689

S/021/61/000/009/005/012
D274/D304

AUTHOR: Pyrogov, I.M.

TITLE: Bending of a cylindrical plate having a reinforced hole

PERIODICAL: Akademiya nauk UkrSSR. Dopovidi. no. 9, 1961, 1136-1139

TEXT : A cylindrical plate is considered with a hole, into which a spring washer of different material is soldered in. The equation of the hole contour is $\rho = \rho_0 = \text{const.}$; ρ being the radius.

The plate is subjected to the bending moment M . The stresses in the plate, as well as in the washer are being determined. The problem is solved by the method of A.I. Lur'ye (Ref. 1: Statika tonkostennykh uprugikh obolochek (Statics of Thin Elastic Shells), Gostekhizdat, 1947). The results obtained are valid for the case of small hole-radius ($\rho_0/a \ll h/a$, where a and h denote the radius and the thickness of the plate). The approximate stress

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S/021/61/000/009/005/012
D274/D304

Bending of a cylindrical plate ...

function is given by

$$\begin{aligned}
 Re\sigma = & -\frac{2}{\pi} B_0 \ln \frac{\gamma\beta q}{1/2} + \left(\frac{1}{\pi} D_0 - \frac{2}{\pi q^2} E_1 \right) \cos 2\lambda + \\
 & + \beta^2 \left[\frac{1}{4} (2B_0 - D_0) q^2 - \frac{2}{\pi} B_1 \ln \frac{\gamma\beta q}{1/2} + \right. \\
 & \left. + \left[\frac{1}{4} (B_0 - D_0) q^2 + \frac{1}{\pi} D_1 - \frac{2}{\pi q^2} E_2 \right] \cos 2\lambda \right] = w_0 + \beta^2 w_1, \quad (1) \\
 Im\sigma = & \frac{1}{\pi} \beta^2 \left\{ 2A_1 \ln \frac{\gamma\beta q}{1/2} - (2B_0 - D_0) q^2 \ln \frac{\gamma\beta q}{1/2} - \left(B_0 - \frac{1}{4} D_0 \right) q^2 + \right. \\
 & + \left[(B_0 - D_0) q^2 \ln \frac{\gamma\beta q}{1/2} + \frac{1}{6} D_0 q^2 - C_1 - \frac{2}{q^2} F_2 \right] \cos 2\lambda - \\
 & \left. \left(\frac{1}{12} D_0 q^2 - \frac{1}{2} E_1 + \frac{4}{q^2} K_1 - \frac{24}{q^4} L_3 \right) \cos 4\lambda \right\} = \psi_0 + \beta^2 \psi_1.
 \end{aligned}$$

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where ρ, λ are polar coordinates with origin at the center of the hole, γ is Euler's constant. The quantities relating to the washer are marked by a prime. The stress function for the washer is

$$\begin{aligned} \text{Re } \sigma' &= Aq^2 + Bq^2 \cos 2\lambda + (\beta')^2 (Cq^2 + Fq^2 \cos 2\lambda) = w_0' + (\beta')^2 w_1', \\ \text{Im } \sigma' &= (\beta')^2 \left[-\frac{1}{4} (A+B)q^2 + Eq^2 + (Hq^2 + Kq^2) \cos 2\lambda + (L_0q^2 + L_1q^2) \cos 4\lambda \right] = \\ &= \psi_0' + (\beta')^2 \psi_1'. \end{aligned} \quad (2)$$

Stress function (2) satisfies the differential equation of circular cylindrical shells with the required accuracy (given by Eq. (1)). For purely cylindrical bending of the plate, the bending function is expressed by

$$w^0 = \frac{Mo^2}{4D(1-\nu)} [(1-\nu) - (1+\nu) \cos 2\lambda] \quad (3) \quad \lambda$$

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where D is the curvature of the plate. The constants $B_0, D_0, \dots, A, B..$ of the stress functions of the plate and the washer are determined from the boundary conditions

$$M_0 = M'_0, Q_0^+ = Q_0^{+'}, w = w', \frac{\partial w}{\partial \rho} = \frac{\partial w'}{\partial \rho} \quad (4)$$

$$S_\rho = S'_\rho, S_{\rho\lambda} = S'_{\rho\lambda}, u = u', v = v' \quad (5)$$

Conditions (4) relate to bending and conditions (5) to tangential stress- and displacement components. In general, these constants are expressed by cumbersome formulas; assuming the same Poisson ratio for both the plate and the washer, simpler expressions for the constants are obtained. Further, the moments are calculated. A numerical example is calculated which shows that the curvature

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of the plate does not affect the value of the largest bending stresses. There are 1 table and 5 Soviet-bloc references.

ASSOCIATION: Vsesoyuznyy zaochnyy politekhnichnyy instytut
(All-Union External Polytechnic Institute)

PRESENTED: by Academician G.M. Savin, AS UkrSSR

SUBMITTED: October 17, 1960

X

Card 5/5

30V/17 0-49... - 0.40

AUTHOR: Pirogov, I. M. (Moscow)

TITLE: Distribution of Stress Around a Hole in a Cylindrical Shell Under the Action of Concentrated Forces (Raspredeleniye napryazheniy okolo otverstiya v tsilindricheskoy obolochke pri deystvii sosredotochennykh sil)

PERIODICAL: Izvestiya Akademii nauk SSSR OTN, Mekhanika i mashinostroyeniye, 1959, Nr 2, pp 146-147 (USSR)

ABSTRACT: Two equal concentrated forces are assumed to act along the generators of the shell and to pass through the centre of the small hole. Approximate expressions for the real and imaginary parts of the stress function are obtained on the basis of a solution due to Lur'ye (Ref 1) and are used to obtain the stress components around the hole. There are 2 Soviet references.

SUBMITTED: May 6, 1958.

Card 1/1

PIROGOV, I.M., dotsent, kand.tekhn.nauk

Stress distribution in a cylindrical plate with a reinforced
hole. Izv.vys.ucheb.zav.; mashinostr. no.1:44-48 '59.
(MIRA 13:3)

1. Moskovskiy ssochnyy politekhnicheskii institut.
(Elastic plates and shells)

SOV 124 58 1 4445

Translation from: Referativnyi zhurnal Mekhanika 1958, No 4, pp 18-19, USSR

AUTHOR: Prigozhin, I. M.

TITLE: The Distribution of Stresses Near a Circular Hole in the Surface of a Circular Cylinder (Raspredeleniye napryazheniy v okrestnostyakh otverstiya na poверхnosti tsilindricheskogo korpusa)

PERIODICAL: Sovetskoye Vsesoyuznoye tekhnicheskoye izdaniye 1958, No 4, pp 48-52

ABSTRACT: The article considers the problem of the determination of the stresses in the vicinity of a hole in a cylindrical shell loaded with moments M distributed evenly along the circumference of the hole. It is assumed that the radius of the hole is small as compared to the dimensions of the shell. The solution of the problem amounts to finding the complex stress function. Simple final expressions are given for the moments and stresses in the vicinity of the hole. In the absence of curvature, the specific forces are reduced to zero, while the moments are equal to the corresponding moments in the infinite plate with a circular hole loaded with equally distributed moments along the circumference of the hole. For the purpose of comparison

Card 1 2

SOV/124-58 4 4445

The Distribution of Stresses Near a Circular Hole (cont.)

of the results of the solution of this problem with the results of the solution of an analogous problem for a thin sheet, a table is adduced showing the values of normal stresses along the circumference of the hole which are produced by bending moments and tensile stresses for various values of the shell parameter. In these calculations the Poisson ratio is assumed to be 1/3.

Yu G Maksimov

1. Cylinders--Physical properties 2. Cylinders--Mechanical properties
3. Cylinders--Stresses 4. Mathematics

Card 2 of 2

21-55-5-11 25

AUTHOR: Pirogov, I.V.

TENSION OF A CURVED PLATE WEAKENED BY A HOLE WITH A PRESSED-
TITLE: in Washer (Rastyazheniye iskrivlennoy plastinki, oslablennoy
otverstiyem, v kotoroye vpressovana zhestkaya shayba)

PERIODICAL: Dopovidi Akademii nauk Ukrain's'koi RSR, 1958, Nr 5, pp 512-
514 (USSR)

ABSTRACT: The author discusses the problem of stretching a circular
cylindrical plate (shell) weakened by an aperture in which a
rigid washer, having a radius somewhat greater than that of
the hole, has been pressed in. It is assumed that there is
no friction between the plate and the washer. In solving
the problem, particular solutions of the equations for the
equilibrium of a cylindrical shell proposed by A. I. Lur'ye
[Ref 1] were used. One numerical example is considered,
which shows that the curvature of the plate substantially
increases the coefficient of stress concentrations. The
analogous problem for the flat plate was solved by Savin
[Ref 2].

ASSOCIATION: There are 2 Soviet references.
Vsesoyuznyy zaochnyy politekhnicheskii institut (All-Union
Correspondence Polytechnic Institute)
Card 1/2

21-56-5-11 28

Tension of a Curved Plate Weakened by a Hole With a Pressed-in Washer

PRESENTED: By Member of the AS UkrSSR. G.N. Savin

SUBMITTED: November 10, 1957

NOTE: Russian title and Russian names of individuals and institutions appearing in this article have been used in the transliteration.

1. Metal plates--Stresses

Card 2/2

PIROGOV, I.M. (Moskva)

Distribution of stresses around a hole in a cylindrical shell
subjected to the action of concentrated forces. Izv. AN SSSR.
Otd. tekhn. nauk. Mekh. i mashinostr. no. 2: 146-147 Mr-Apr '59.

(MIRA 12:5)

(Elastic plates and shells)

PIROGOV, I.M.

Torsion and shift of a curved plate weakened by a hole.

Izv.vys.ucheb.zav.; av.tekh. 2 no.3:32-35 '69.

(MIRA L:1.)

1. Vsesoyuznyy nauchnyy politekhnicheskii institut.
(Elastic plates and shells)

PIROGOV, I.M. [Pyrohov, I.M.]

Tension of a warped plate weakened by a hole with a pressed-in washer [with summary in English]. Dop. AN URSR no.5:512-514 '58.
(MIRA 11:6)

1.Vsesoyuzniy nauchnyy politekhnicheskii institut. Predstavleno akademikom AN USSR G.N. Savinym H.N. Savinym].
(Elastic plates and shells)

193000", I. V.

"Concentration of Stress Near the Rigidity Center in a Thin-Walled Cylindrical Shell."
Thesis for degree of C. Sc. Technical Sci. Submitted Jun 5, 1954, Moscow State
Aviation Inst Leningrad State Univ.

Summary 11, 4 Sep 54, Dissertations Presented for Degrees in Science and Medicine
in Moscow in 1954. From Vestnik Vuzov. Jan-Dec 1954.

PIROGOV, I.M.

Stresses in a cylindrical shell weakened by a hole and subject
to the action of a concentrated force. Nauch. dokl. vys. shkoly.
mesh. 1 prib. no.2:75-77 '59. (MIRA 12:12)
(Elastic plates and shells)

PODRABINIK, G.M.; PIKOVETS, I.T., IERGOV, I.Ya.; LEVENKHTSYN, A.V.

Dynamics of the content of proteins and gamma globulins in antitoxin
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Nauch. osn. proizv. bakt. prep. 10:220-243 '61.

1. Khabarovskiy institut epidemiologii i mikrobiologii.

KURBANOVA, N.A.; KURBANOV, A.A.; KAPETAN, E.L.; YAKOVLEV, A.A.; PIRIGOVA,
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Abstracts. Intern. microbiol., epid. i immu. 41 no. 411-412.

41: 64.

1. Moskovskiy institut epidemiologii i mikrobiologii (for Kurbanova).
2. Kaluzhskaya rayonnaya bol'nitsa Morbavoy SSR i Vinnitskiy meditsinskiy institut imeni Pirogova (for Pirogov).
3. Stavropol'skiy institut vektorskiy i parazitarnykh bolezney (for Kaptan).
4. Kazanskii obshchestvennyy otel znavshchey (for Yakovlev, A.A.).
5. Donetsk meditsinskiy institut (for Manolova).
6. Kaluzhskaya rayonnaya imeni A. Komarovskiy sanitarno-epidemiologicheskaya stantsiya (for Akopyan, R.A.).
7. Kemerovskiy meditsinskiy institut (for Pritsenko).
8. Tatarskiy meditsinskiy institut (for Punskeya, Burmistrova).
9. Gor'kovskiy institut epidemiologii i mikrobiologii i Gor'kovskaya rayonnaya sanitarno-epidemiologicheskaya stantsiya (for D'yakenko).
10. Institut meditsinskoy parazitologii i tropicheskoy meditsiny imeni Vissal'ize Ministerstva zdravookhraneniya Gruzinskoy SSR (for Topuriya, Matabeli, Gigitashvili, Vachnadze).
11. Kazanskii institut usovershenstvovaniya (for Nabiyeu).

BORISENKO, I.T.; FERENCZOV, I.R.; YEREMEV, I.V.; KARAYSHNIK, V.V.; KUZOVKOV, I.T.; BORISENKO, I.T.; KULIKOVSEAYA, N.V.; SAVINOV, S.I., kand.fiz.-mat. nauk, dots. [deceased]; PIROGOV, I.Z.; Priznani uchastiye: BALAYEVA, I.A.; BALAKIN, S.I.; BELYAYEVA, L.N.; BELYAKOV, V.I.; VELERSHTEYN, R.A.; ZHAROV, G.M.; KOROLEVA, V.Ye.; LITVIN-SEDOY, M.Z.; POPOV, A.I.; PRIVALOV, V.A.; STUKALOVA, L.N.; CHISTYAKOV, A.I.; SAVVIN, A.A., red.; CHISTYAKOVA, K.S., tekhn. red.

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(Mechanics--Laboratory manuals)